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EXAMINER

ANYA, CHARLES E

ART UNIT PAPER NUMBER

2194

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/771,837

Applicant(s)

LIU ET AL.

Examiner

Charles E. Anya

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 9/14/06.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-28 and 30-51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-28 and 30-51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1,3-28 and 30-51 are pending in this application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action: .

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1,3-6,8,10,15,16 and 23-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pub. No. 2004158589 A1 to Liang et al. in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al.**

4. As to claim 1, Liang teaches a computer readable medium comprising computer-program instructions executable by a processor and implementing instructions for: a runtime hosting interface comprising a host abstraction interface (HAI), the HAI corresponding to execution environment abstraction(s) supported by a host application (VMPI 215/Profiler 220 page 2 paragraphs 0024-026, page 8 paragraphs 0183/0184, "...JVMPI..." page 11 paragraph 0258), at least one specific interface or object corresponding to a specific one HAI being accessible by a runtime during execution of runtime managed code and responsive to an action or event associated with an identified one HAI, the HAI providing an interface for the runtime to configure host

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execution environment parameters and/or notify the host application of a runtime event (“...notifies...” page 8 paragraphs 0183/0184, “...NotifyEvent...” page 9 paragraphs 0207-0227, page 11 paragraphs 0268).

Liang is silent with reference to the computer-readable medium as recited in claim 1, wherein an interface of the HAI provides the runtime with a pointer to an object associated with the interface, the object for calling by the runtime responsive to a specified event or criteria.

Benayon teaches the computer-readable medium as recited in claim 1, wherein an interface of the HAI provides the runtime with a pointer to an object associated with the interface, the object for calling by the runtime responsive to a specified event or criteria (Col. 5 Ln. 60 – 67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Liang with the teaching of Benayon because the teaching Benayon would improve the system of Liang by providing a method of determining the availability of minimum size of heap memory and allocating the heap extension to a user application (Col. 3 Ln. 23 – 31).

5. As to claim 3, Liang teaches the computer-readable medium as recited in claim 1, wherein the one or more execution environment abstractions correspond to management services for memory, threads/tasks, I/O completion, synchronization, runtime entry/exit notification, security context, impersonation, runtime configuration, customized assembly loading, host protection, garbage collection (GC), debugging,

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and/or executable code service abstractions ("...JVMPI..." pages 7/8 paragraphs 0095-0180).

6. As to claim 4, Liang teaches the computer-readable medium as recited in claim 1, wherein the runtime hosting interface further comprises a runtime interface (RI) for use by the host application to configure operations of the runtime, notify the runtime of an event, and/or to obtain additional information during host application process execution (page 11 paragraphs 0247-0251/0265-0267, page 14 paragraphs 0324/0325).

7. As to claim 5, Liang teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to identify host application implemented ones of the HAI or associated object(s) for subsequent calling responsive to an action or event associated with an identified one of the respective execution environment abstractions (page 9 paragraphs 0201-0206).

8. As to claim 6, Liang teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to request the host application to perform a memory allocation (JVMPI_EVENT_OBJECT_ALLOC page 19 paragraphs 0433/0434).

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9. As to claim 8, Liang teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to create a new thread/task via the HAI (page 11 paragraphs 0247/0265-0267).

10. As to claim 10, Liang teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to notify the host application that a task cannot be moved to a different physical OS thread and cannot have execution of the task blocked for a specified window of time (page 19 paragraphs 0445-0047).

11. As to claim 15, Liang teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to modify an object identified by an interface of the HAI (“...priority...” page 12 paragraph 0268).

12. As to claim 16, Liang teaches the computing device as recited in claim 15, wherein the object is a task priority (“...priority...” page 12 paragraph 0268).

13. As to claim 23, Benayon teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to supply the host application with a runtime implemented callback, the runtime implemented callback for invoking by the host application when an asynchronous I/O operation completes (“...second function...” Col. 4 Ln. 49 – 53, Col. 6 Ln. 18 – 19).

14. As to claim 24, Benayon teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to supply a runtime implemented callback to the host application, the runtime implemented callback to be invoked by the host application when an asynchronous I/O operation completes, the runtime implemented callback being used by the runtime to provide custom state information to the host application (“...callback function...” Col. 3 Ln. 25 – 31, “...second function...” Col. 4 Ln. 49 – 53).

15. As to claim 25, Liang teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to: generate a task (CreateSystemThread page 11 paragraphs 0266/027); and specify one or more synchronization objects for the task to substantially ensure host application knowledge of a lock on the task, the one or more synchronization objects comprising a critical section, a manual and/or auto-reset event, a semaphore, a reader/writer lock, and/or a task monitor (“JVMPi_EVENT_MONITOR...” page 18 paragraphs 0413-0421).

16. As to claim 26, Liang teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to notify the host application of one or more runtime interfaces allowing the host application to notify the runtime of events and/or to obtain additional information during host application process execution (“...RequestEvent...” page 14 paragraphs 0324/0325).

17. As to claim 27, see the rejection of claim 1 above.

18. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pub. No. 2004158589 A1 to Liang et al. in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al. as applied to claim 1 above, and further in view of U.S. Pub. No. 20030056076 A1 to Cook et al.

19. As to claim 7, Liang is silent with reference to the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to communicate a low memory notification from an OS to the host application, and/or inform the host application of consequences of failing a particular memory allocation via an HAI.

Cook teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to communicate a low memory notification from an OS to the host application, and/or inform the host application of consequences of failing a particular memory allocation via an HAI (Col. 5 Ln. 32 – 67, Col. 6 Ln. 1 – 7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Benayon and Liang with the teaching of Cook because the teaching Cook would improve the system of Benayon and Liang by providing method of managing memory allocation by determining the availability of memory (Cook Col. 1 Ln. 39 – 47).

20. Claims 9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pub. No. 2004158589 A1 to Liang et al. in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al. as applied to claim 1 above, and further in view of U.S. Pat. No. 7,007,269 B2 to Sluiman et al.

21. As to claim 9, Liang is silent with reference to the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to reuse or pool a runtime-implemented portion of a task via the HAI.

Sluiman teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to reuse or pool a runtime-implemented portion of a task via the HAI (Col. 6 Ln. 15 – 20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Benayon and Liang with the teaching of Sluiman because the teaching Sluiman would improve the system of Benayon and Liang by providing a process of identifying a thread and allowing other trace elements to reference the thread through the transientThreadId (Sluiman Col. 12 Ln. 44-45).

22. As to claim 13, Sluiman teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to: provide a callback to the host application for notifying the runtime that a task has been moved to a different locale or a locale has changed for the task; and/or notify the host application, that a task

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has been moved to a different locale or a locale has changed for the task (Col. 4 Ln. 39 – 44).

23. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pub. No. 2004158589 A1 to Liang et al. in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al. as applied to claim 1 above, and further in view of U.S. Pat. No. 6,915,457 B1 to Miller.

24. As to claim 11, Liang is silent with reference to the computer-readable medium as recited in claim 1, wherein the HAI comprises: an interface for the runtime to indicate a callback to the host application, the callback for notifying the runtime when a task has been moved to a runnable or non-runnable state; and if the task has been moved to a non-runnable state, an interface to specify that the task is to be rescheduled as soon as possible by the host application.

Miller teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises: an interface for the runtime to indicate a callback to the host application, the callback for notifying the runtime when a task has been moved to a runnable or non-runnable state; and if the task has been moved to a non-runnable state, an interface to specify that the task is to be rescheduled as soon as possible by the host application (figure 10 Col. 15 Ln. 33 – 67, Col. 16 Ln. 1 – 13).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Benayon and Liang with the teaching of

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Miller because the teaching Miller would improve the system of Benayon and Liang by providing a process of restoring paths when it is determined that a application program has failed (Miller Col. 15 Ln. 33 – 34).

25. Claims 12 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pub. No. 2004158589 A1 to Liang et al. in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al. as applied to claim 1 above, and further in view of U.S. Pat. No. 6,457,142 B1 to Klemm et al.

26. As to claim 12, Liang is silent with reference to the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to: queue a thread/task to a host application implemented thread pool; set a size of the host application implemented thread pool; and/or query the host application implemented thread pool.

Klemm teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to: queue a thread/task to a host application implemented thread pool; set a size of the host application implemented thread pool; and/or query the host application implemented thread pool (“...queue up...” Col.15 Ln. 20 – 21).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Benayon and Liang with the teaching of Klemm because the teaching Klemm would improve the system of Benayon and Liang

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by providing a method for determining when to suspend and subsequently queue a thread (Klemm Col. Ln. 10 – 21).

27. As to claim 21, Klemm teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to specify a maximum number of threads/tasks that will be available to service requests on one or more I/O completion ports (“...user-specified threshold...” Col. 6 Ln. 19 – 20).

28. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pub. No. 2004158589 A1 to Liang et al. in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al. as applied to claim 1 above, and further in view of U.S. Pub. No. 20030167421 A1 to Klemm (Hereinafter referred Klemm’421).

29. As to claim 14, Liang is silent the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to delay the host application abort of a task.

Klemm’421 teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to delay the host application abort of a task (Step 513 page 8 paragraph 0106).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Benayon and Liang with the teaching of Klemm’421 because the teaching Klemm’421 would improve the system of Benayon

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and Liang by providing a process for detecting thread starvation (Klemm'421 page 7 paragraph 0102).

30. Claims 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pub. No. 2004158589 A1 to Liang et al. in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al. as applied to claim 1 above, and further in view of U.S. Pat. No. 5,909,580 to Crelier et al.

31. As to claim 17, Liang is silent with reference to the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to notify the host application that a task/thread is to leave the runtime into unmanaged code.

Crelier the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to notify the host application that a task/thread is to leave the runtime into unmanaged code (Col. 16 Ln. 50 – 61).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Benayon and Liang with the teaching of Crelier because the teaching Crelier would improve the system of Benayon and Liang by providing a method of avoiding re-entry into a runtime library (Crelier Col. 16 Ln. 50 – 61).

32. As to claim 18, Crelier teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to notify the host

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application that a task/thread is to reverse-leave the runtime into unmanaged code (Col. 16 Ln. 50 – 61).

33. As to claim 19, Crelier teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to notify the host application that a task/thread is to enter the runtime from unmanaged code (Col. 16 Ln. 50 – 61).

34. As to claim 20, Crelier teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to notify the host application that a task/thread is to reverse-enter the runtime from unmanaged code (Col. 16 Ln. 50 – 61).

35. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pub. No. 2004158589 A1 to Liang et al. in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al. as applied to claim 1 above, and further in view of U.S. Pub. No. 20030093433 A1 to Seaman et al.

36. As to claim 22, Benayon and Liang are silent with reference to the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to binding a handle to an I/O completion port of the host application.

Seaman teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to binding a handle to an I/O completion port of the host application (page 10 paragraphs 0168/0173).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Benayon and Liang with the teaching of Seaman because the teaching Seaman would improve the system of Benayon and Liang by providing interfaces (General Movement Classes) for handling of data movement to and from a process (Seaman page 10 paragraph 0168).

37. Claims 28,30-32,34,36,41 and 48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over by U.S. Pub. No. 20030033443 A1 to Igotti in view of U.S. Pub. No. 20040158589 A1 to Liang et al., and further in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al.

38. As to claim 28, Igotti teaches a computing device for enhanced runtime hosting, the computing device comprising: means for identifying, by a runtime one or more execution environment abstractions implemented by a host application, the host application for hosting the runtime (“...API...” page 2 paragraph 0026, “...second category...” page 3 paragraph 0028, Step330/Step 340 page 3 paragraph 0035); during execution of runtime managed code and responsive to an action or event associated with an identified one of the respective execution environment abstractions, means for the runtime to interface with specific ones of the execution environment abstractions

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(figure 2 "...Operation 220..." page 3 paragraph 0028, Step 380 page 3 paragraph 0036, figure 4 SEND/POST/CALL, figure 5 SEND/POST/CALL, APPENDIX A pages 4-8 paragraph 0042).

Igotti is silent with reference to the HAI providing an interface for the runtime to configure host execution environment parameters and/or notify the host application of a runtime event, wherein the execution environment abstractions correspond to memory management, threads/tasks, I/O completion, synchronization, runtime entry/exit notification, security context, impersonation, runtime configuration, executable service code abstractions, and/or garbage collection (GC) and an interface of the HAI provides the runtime with a pointer to an object associated with the interface, the object for calling by the runtime responsive to a specified event or criteria.

Liang teaches the HAI providing an interface for the runtime to configure host execution environment parameters and/or notify the host application of a runtime event ("...notifies..." page 8 paragraphs 0183/0184, "...NotifyEvent..." page 9 paragraphs 0207-0227, page 11 paragraphs 0268), execution environment abstractions corresponding to memory management, threads/tasks, I/O completion, synchronization, runtime entry/exit notification, security context, impersonation, runtime configuration, executable service code abstractions, and/or garbage collection (GC) ("...JVMPI..." pages 7/8 paragraphs 0095-0180).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Igotti with the teaching of Liang because the teaching Liang would improve the system of Igotti by providing a flexible and

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comprehensive interface that uniformly accommodates a wide variety of memory allocation and garbage collection methods (page 3 paragraph 0039).

Benayon teaches the computer-readable medium as recited in claim 1, wherein an interface of the HAI provides the runtime with a pointer to an object associated with the interface, the object for calling by the runtime responsive to a specified event or criteria (Col. 5 Ln. 60 – 67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Liang and Igotti with the teaching of Benayon because the teaching Benayon would improve the system of Liang and Igotti by providing a method of determining the availability of minimum size of heap memory and allocating the heap extension to a user application (Benayon Col. 3 Ln. 23 – 31).

39. As to claim 30, Liang teaches the computing device as recited in claim 28, wherein the execution environment abstractions comprise means for interfacing with an object associated with the host application, the runtime interfacing with the object responsive to a specified event or criteria that occurs during host application execution (page 11 paragraphs 0247-0251/0265-0267, page 14 paragraphs 0324/0325).

40. As to claim 31, Liang teaches the computing device as recited in claim 28, wherein the execution environment abstractions comprise means for the host application to configure operations of the runtime, notify the runtime of an event, and/or

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to obtain additional information during host application process execution

("...RequestEvent..." page 14 paragraphs 0324/0325).

41. As to claim 32, Liang teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to request a memory allocation (JVMPI_EVENT_OBJECT_ALLOC page 19 paragraphs 0433/0434).

42. As to claim 34, Liang teaches the computing device as recited in claim 28, wherein the execution environment abstractions comprise means for the runtime to create a new thread/task (page 11 paragraphs 0247/0265-0267).

43. As to claim 36, Liang teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to notify the host application that a task cannot be moved to a different physical OS thread and cannot have execution of the task blocked for a specified window of time (page 19 paragraphs 0445-0447).

44. As to claim 41, Liang teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to adjust priority of a task associated with the host application ("...priority..." paragraph 0268).

45. As to claim 48, Benayon teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to indicate a runtime implemented callback to the host application, the runtime implemented callback for calling by the host application when an asynchronous I/O operation completes (“...second function...” Col. 4 Ln. 49 – 53, Col. 6 Ln. 18 – 19).

46. As to claim 49, Benayon teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to supply a runtime implemented callback to the host application, the runtime implemented callback for invoking by the host application when an asynchronous I/O operation completes, the runtime implemented callback giving the host application an opportunity to communicate custom state information to the runtime implemented callback (“...callback function...” Col. 3 Ln. 25 – 31, “...second function...” Col. 4 Ln. 49 – 53).

47. As to claim 50, Liang teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to: generate a task; and create one or more synchronization objects for the task to substantially ensure host application knowledge of a lock on the task, the one or more synchronization objects comprising a critical section, a manual and/or auto-reset event,

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a semaphore, a reader/writer lock, and/or a task monitor

("JVMPI_EVENT_MONITOR..." page 18 paragraphs 0413-0421).

48. As to claim 51, Liang teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to notify the host application of one or more runtime interfaces exposed by the runtime, the runtime interfaces for the host application to notify the runtime of an event and/or to obtain additional information during process execution ("...RequestEvent..." page 14 paragraphs 0324/0325).

49. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over by U.S. Pub. No. 20030033443 A1 to Igotti in view of U.S. Pub. No. 20040158589 A1 to Liang et al. and further in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al. as applied to claim 28 above, and further in view of U.S. Pub. No. 20030056076 A1 to Cook et al.

50. As to claim 33, Benayon, Liang and Igotti are silent with reference to the computing device as recited in claim 28, wherein the execution environment abstractions comprise means for the runtime to: communicate a low memory notification from the OS to the host application; and/or inform the host application of consequences of failing a particular memory allocation.

Cook teaches the computing device as recited in claim 28, wherein the execution environment abstractions comprise means for the runtime to: communicate a low memory notification from the OS to the host application; and/or inform the host application of consequences of failing a particular memory allocation (Col. 5 Ln. 32 – 67, Col. 6 Ln. 1 – 7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Benayon, Liang and Igotti with the teaching of Cook because the teaching Cook would improve the system of Benayon, Liang and Igotti by providing a method of managing memory allocation by determining the availability of memory (Cook Col. 1 Ln. 39 – 47).

51. Claims 35 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pub. No. 20030033443 A1 to Igotti in view of U.S. Pub. No. 20040158589 A1 to Liang et al. and further in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al. as applied to claim 28 above, and further in view of U.S. Pat. No. U.S. Pat. No. 7,007,269 B2 to Sluiman et al.

52. As to claim 35, Benayon, Liang and Igotti are silent with reference to the computing device as recited in claim 28, wherein the execution environment abstractions comprise means for the runtime to reuse or pool a runtime-implemented portion of a task.

Sluiman teaches the computing device as recited in claim 28, wherein the execution environment abstractions comprise means for the runtime to reuse or pool a runtime-implemented portion of a task (Col. 6 Ln. 15 – 20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Benayon, Liang and Igotti with the teaching of Sluiman because the teaching Sluiman would improve the system of Benayon, Liang and Igotti by providing a process of identifying a thread and allowing other trace elements to reference the thread through the transientThreadId (Sluiman Col. 12 Ln. 44-45).

53. As to claim 39, Sluiman teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to: provide a callback to the host application for notifying the runtime that a task has been moved to a different locale or a locale has changed for the task; and/or notifying, by the runtime via the at least one specific interface or object, the host application, that a task has been moved to a different locale or a locale has changed for the task (Col. 4 Ln. 39 – 44).

54. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pub. No. 20030033443 A1 to Igotti in view of U.S. Pub. No. 20040158589 A1 to Liang et al. and further in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al. as

applied to claim 28 above, and further in view of U.S. Pat. No. U.S. Pat. No. 6,915,457 B1 to Miller.

55. As to claim 37, Benayon, Liang and Igotti are silent with reference to the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to: identify a runtime interface for the host application to invoke when a task has been moved to a runnable or non-runnable state; and if the task has been moved to a non-runnable state, specify that the task is to be rescheduled by the host application.

Miller teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to: identify a runtime interface for the host application to invoke when a task has been moved to a runnable or non-runnable state; and if the task has been moved to a non-runnable state, specify that the task is to be rescheduled by the host application (figure 10 Col. 15 Ln. 33 – 67, Col. 16 Ln. 1 – 13).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Benayon, Liang and Igotti with the teaching of Miller because the teaching Miller would improve the system of Benayon, Liang and Igotti by providing a process of restoring paths when it is determined that a application program has failed (Miller Col. 15 Ln. 33 – 34).

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56. Claims 38 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over by over U.S. Pub. No. 20030033443 A1 to Igotti in view of U.S. Pub. No. 20040158589 A1 to Liang et al. and further in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al. as applied to claim 28 above, in view of U.S. Pat. No. 6,457,142 B1 to Klemm et al.

57. As to claim 38, Benayon, Liang and Igotti are silent with reference to the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to: queue a thread/task to a host application implemented thread pool; set a size of the host application implemented thread pool; and/or query the host application implemented thread pool.

Klemm teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to: queue a thread/task to a host application implemented thread pool; set a size of the host application implemented thread pool; and/or query the host application implemented thread pool (“...queue up...” Col.15 Ln. 20 – 21).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system Benayon, Liang and Igotti with the teaching of Klemm because the teaching Klemm would improve the system of Benayon, Liang and Igotti by providing a method for determining when to suspend and subsequently queue a thread (Klemm Col. Ln. 10 – 21).

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58. As to claim 46, Klemm teaches the computer-readable medium as recited in claim 1, wherein the HAI comprises an interface for the runtime to specify a maximum number of threads/tasks that will be available to service requests on one or more I/O completion ports ("...user-specified threshold..." Col. 6 Ln. 19 – 20):

59. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over by U.S. Pub. No. 20030033443 A1 to Igotti in view of U.S. Pub. No. 20040158589 A1 to Liang et al. and further in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al. as applied to claim 28 above, and further in view of U.S. Pub. No. 20030167421 to Klemm (Hereinafter referred Klemm'421).

60. As to claim 40, Benayon, Liand and Igotti are silent with reference to the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to delay host application abort of a task.

Klemm'421 teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to delay host application abort of a task (Step 513 page 8 paragraph 0106).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Benayon, Liang and Igotti with the teaching of Klemm'421 because the teaching Klemm'421 would improve the system of Benayon,

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Liang and Igotti by providing a process for detecting thread starvation (Klemm'421 page 7 paragraph 0102).

61. Claims 42-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pub. No. 20030033443 A1 to Igotti in view of U.S. Pub. No. 20040158589 A1 to Liang et al. and further in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al. as applied to claim 28, and further in view of U.S. Pat. No. 5,909,580 to Crelier et al.

62. As to claims 42, Benayon, Liang and Igotti are silent with reference to the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to notify the host application that a task/thread is to leave the runtime into unmanaged code.

Crelier teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to notify the host application that a task/thread is to leave the runtime into unmanaged code (Col. 16 Ln. 50 – 61).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Benayon, Liang and Igotti with the teaching of Crelier because the teaching Crelier would improve the system of Benayon, Liang and Igotti by providing a method of avoiding re-entry into a runtime library (Crelier Col. 16 Ln. 50 – 61).

63. As to claim 43, Crelier teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to notify the host application that a task/thread is to reverse-leave the runtime into unmanaged code (Col. 16 Ln. 50 – 61).

64. As to claim 44, Crelier teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to notify the host application that a task/thread is to enter the runtime from unmanaged code (Col. 16 Ln. 50 – 61).

65. As to claim 45, Crelier teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to notify the host application that a task/thread is to reverse-enter the runtime from unmanaged code (Col. 16 Ln. 50 – 61).

66. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pub. No. 20030033443 A1 to Igotti in view of U.S. Pub. No. 20040158589 A1 to Liang et al. and further in view of U.S. Pat. No. 6,816,956 B1 to Benayon et al. as applied to claim 28 above, and further in view of U.S. Pat. No. U.S. Pub. No. 20030093433 to Seaman et al.

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67. As to claim 47, Benayon, Liang and Igotti are silent with reference to the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to bind a handle to an I/O completion port of the host application.

Seaman teaches the computing device as recited in claim 28, wherein the execution environment abstractions further comprise means for the runtime to bind a handle to an I/O completion port of the host application (page 10 paragraphs 0168/0173).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Benayon, Liang and Igotti with the teaching of Seaman because the teaching Seaman would improve the system of Benayon, Liang and Igotti by providing interfaces (General Movement Classes) for handling of data movement to and from a process (Seaman page 10 paragraph 0168).

Response to Arguments

Applicant's arguments with respect to claims 1,3-28 and 30-51 have been considered but are moot in view of the ground(s) of rejection.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles E. Anya whose telephone number is (571) 272-3757. The examiner can normally be reached on M-F (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Thomson can be reached on (571) 272-3718. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Examiner
Art Unit 2194

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